

Appendix L-1 – Calculating Combined Cycle and Co-generation Block Data

Using the Synthesis Event and Performance Method When Reporting Each Gas Turbine/Steam Turbine Unit

Overview

This document will explain the synthesis method for collecting combined cycle data on a unit-level basis and creating combined cycle block statistics from the unit-level event and performance information.

This document applies to only those reporters who wish to report event and performance data for each generating unit individually. This document does not apply to those reporters wishing to continue reporting combined cycle data to GADS as a ‘single unit’ (or traditional method). The traditional method will still be accepted by GADS but is not favored over the reporting of each generating unit within the block.

***Please Note:** The majority of this document is the same as the fleet-type roll up method. The basic data gathering process on a unit-level basis are identical in all respects. The differences will be in creating block statistics from the unit-level data.*

IEEE 762 does not address reporting separate units and bringing the components together to create combined cycle block statistics. Therefore, this document establishes a NERC methodology for creating new combined cycle block event and performance records based on reported unit-level event and performance records.

Terms

In order to continue this discussion, some terms must be agreed on to eliminate some of the ambiguity concerning combined cycle blocks in general.

- **Combined Cycle Block (also known in the industry as a “Block”)** – By definition, a combined cycle is a process for generating energy (either electricity or steam) constituted by the marriage of a Brayton Cycle (expand hot gas to turn a gas turbine) with a Rankine Cycle (use heat to boil water to make steam to turn a steam turbine). A combined cycle block employs an electric generating technology in which electricity and process steam is produced from otherwise lost waste heat exiting from one or more combustion turbines. In most situations, the exiting waste heat is routed to a conventional boiler or to a heat recovery steam generator (HRSG) for use by a steam turbine in the production of electricity. Therefore, the combined cycle block consists of one or more gas turbines/jet engines, one or more steam turbines, and balance of plant equipment supporting the production of electricity or steam energy.

There may be more than one combined cycle block at a plant site. Our discussion relates to each individual combined cycle block reporting, not the process of reporting several combined cycle blocks as one plant site.

- **Units** – Each generator set is considered a “unit”. Typically in combined cycle, each gas turbine or jet engine and each steam turbine are considered a “unit.” Each unit contributes to the total electric generation of the combined cycle block. Each unit has one or more of its own generators for providing electric power.
- **Heat Recovery Steam Generator (HRSG)** – There may be one or more HRSG or waste heat boiler in a combined cycle block. Some units may have a single HRSG per GT/jet; others may have several GT/jet feeding a single HRSG. The HRSG does not contribute electricity to the output of the combined cycle block and so, is considered a component rather than a unit.
- **Other Balance of Plant Equipment** – There are other equipment in the combined cycle block used to support the production of electricity. They are not related to any specific part of the block and are also considered as components.

Combined Cycle Block/Unit Numbering

The combined cycle block and unit numbering system should be straightforward and follow the usual guidelines. The combined cycle block will be identified by the range 800-899 and will be used to relate the individual units to the block level. The gas turbine/jet units will be numbered from 300-399 or 700-799. The steam turbine units will be numbered as Fossil Steam Turbines in the range of 100-199.

Impact on Design Data

It will be necessary for each generating company to provide new and/or additional design data for the combined cycle blocks that you submit GADS data on to NERC. This new design data will allow NERC to identify the specific units that make up each combined cycle block for the purposes of creating synthesized calculations of the unit-level data that is submitted to NERC.

- **Units** - The design data will be reported as though each unit were a separate generator. That being that each unit would have its own unit number and design data as described in the NERC guidelines for each unit type. In addition to this, the unit would be marked as being part of a combined cycle block by a field that would hold the Identifying 800 series unit code of the combined cycle block.
- **Combined cycle block** – Balance of plant and other equipment not directly related to each unit will be coded as described for the combined cycle block.

Cause Codes

Since each unit of the combined cycle block can affect the generation of the other units, it is conceivable to have a situation where a derate in a gas turbine or jet engine may have a steam turbine cause code. (See Example 2 below). In other words, the cause codes for all units will be open to all Task Force approved cause codes for all units within the combined cycle blocks.

Reporting Event Records

Events are reported on the unit level only. NO COMBINED CYCLE BLOCK EVENTS ARE REPORTED TO NERC! Since the design data links the units together with the combined cycle block, the event records of the units data will be used to create event records of the combined cycle block. The unit-level event data will be used by NERC to synthesize block-level data for use in calculating traditional industry statistics. All the normal methods/rules would apply with the exception of cause codes crossing over between dissimilar unit types.

Reporting Performance Records

Performance records will be reported on a unit basis only. NO COMBINED CYCLE BLOCK PERFORMANCE RECORDS ARE REPORTED TO NERC! Since the design data links the units together to the combined cycle block, the performance records of the individual units will be used by NERC to calculate traditional industry statistics using the synthesis method. The general procedure for combining unit performance records to form a combined cycle block record will be explained later in this document.

Therefore, if you operate a combined cycle block with 2 gas turbines and one steam turbine, you will report 36 performance records annually – one set of 12 performance records for each gas turbine unit and one set of 12 performance records for the steam turbine unit.

Effects on pc-GAR Peer Groups

Exposing the data on the units of combined cycle block allows those units to become part of other peer groups. In pc-GAR, the following options could be given when the peer group is created.

- Include units – ex: Create a gas turbine peer group that includes gas turbines in simple cycle operation with those in combined cycle blocks.
- Include units only – ex: View gas turbine units in combined cycle blocks operation only.
- Combined Cycle blocks will be available for each of the three groups shown below or groups 1 and 2 **or** 1 and 3:
 1. Not rolled up (neither syntheses or fleet) but used only reported block data as supplied by the reporter (traditional data reporting).
 2. Creating block data using the synthesis event and performance method shown in this document.
 3. Creating block data using the fleet-type roll up method described in a separate document “Calculating Combined Cycle Block Data Using a Fleet-type Roll up Method When Reporting Each Gas Turbine/Steam Turbine Unit.”

Not everyone will wish to use some of these options. However, GADS is committed to provide options to all since the individual needs of GADS data users also vary.

Calculating the Synthesized Combined Cycle Block Statistics from the Unit Event & Performance Records

Combined cycle block performance records are not reported to NERC. However, NERC needs combined cycle block performance records and the impact of deratings for its reports. For this reason, computers can be programmed to analyze equipment failures based on time (minute by minute) generation capabilities of each unit within the block. This is a synthesis of the individual unit event data to represent the equivalent performance of a defined combined cycle block. The combined cycle block is defined by the information submitted on the new combined cycle design data forms.

There will be times when two units will be out (one on outage and the other on derate) and the computer will realize by examining the units event records that the unit is not in service but the combined cycle block is still providing electric power.

Examples of creating a block performance record are illustrated in the examples below. Please note that there is no double counting of penalties on the combined cycle block; we are actually maintaining the impact of the problem of one unit on another unit. The addition of the two units affects the overall electric production of the block.

Now, there will be times when the cause code of one unit (GT#1 for example) will also be shown on a second unit (the steam turbine for example). That is because of the resultant outage of the GT affected the steam production on the steam turbine, resulting in the steam turbine's inability to provide full capacity. This may look as if it were "double" counting (see Example #2). However, the steam turbine itself is not in need of repairs and the cause of the reduction in steam turbine production to the steam turbine points to a GT (doesn't say which one, just "a" GT). Therefore, the GT gets two penalties against it: for the outage (to the GT#1 itself) and for the derate (to the steam turbine.) which may appear as a "double counting", but is not! This is because the GT actually caused the entire shortage.

Please note two things:

- 1) when GT#1 is on outage, the outage time and cause is related to GT#1 via the event record (only the outage is related to GT#1!), and
- 2) the derate to the steam turbine is NOT related to GT#1 "directly" because the derate is shown to be caused by a GT component (cause code) but not identifying which GT (assuming there is more than one GT unit). Therefore, when the computer calculates the statistics of GT#1, it only sees the outage, not the derate. When the computer calculates the statistics on the steam turbine, it sees the derate caused by a GT. Therefore, GT#1 is not penalized twice, but only the one time.

In the NERC performance statistics, you would see the following:

GT#1 EAF=..., EFOR=....., etc
 GT#2 EAF=.... EFOR = Etc
 Steam Turbine EAF= EFOR = etc.

These values would be calculated based on only the performance and event records directly attributed to each of the individual units. However, when you report on cause code or component based values, the entire effect of the outage will be taken into account. With the effect of the outage being attributed to the component and not the unit, the unit is not unduly penalized.

The number of MWhs generated by each unit can be added together monthly for creating a MWh generated combined cycle block.

However, the number of service hours, forced outage hours, etc for the combined cycle block performance record can only be created by analyzing the unit event records on an event by event basis. This procedure is necessary to determine if the combined cycle block is generating power or is completely off line. In the synthesis method, the sum of the units FO, PO, etc cannot be used. For example, if a GT is on forced outage, then the combined cycle block may still be generating power and the GT outage hours are not reflected on the block performance record because it is a derating for the block, not a block outage.

Special Rules Used in Calculating Synthesized Combined Cycle Block Data from Unit-level Data

There is a need to establish some rules for synthesizing combined cycle blocks. The rules will insure uniformity in creating synthesized statistics from the unit-level data.

RULE #1: the outage for the combined cycle block starts when the breaker of the last of the units is opened and ends when the breaker of the first unit is closed.

RULE #2: the number of attempted and actual starts for the combined cycle block is determined by the first unit's breaker is closed. If the unit starts without a problem, then there is one attempted and one actual start for the combined cycle block. If the first unit has a startup failure and a second unit is then started, then the combined cycle block will have two attempted starts and one actual start.

RULE #3: A unit is on reserve shutdown when it is removed from service for economic reasons or the electricity is not needed on the system (standard RS definition.)

The reserve shutdown may affect other units (for example a GT out on reserve shutdown will reduce the steam to the steam turbine). In such cases where the steam turbine is still in operation, there would be no event reported because of the reduction in steam flow because the steam turbine is operating as if in load following and can return to full capacity as soon as the GT unit is returned to service.

RULE #4: A combined cycle block is on reserve shutdown if one or more of the gas turbine/jet units is also on reserve shutdown and the combined cycle block is not in operation. That means other units of the combined cycle block may be on forced, maintenance or planned outage but the combined cycle block still has the capability to produce electricity with the one or more units on reserve shutdown.

RULE #5: As reported for other unit types, coast down to outages is not reported to GADS. Therefore, the orderly removing of units towards an outage (standard outage procedure) are considered coast downs and not reported as penalties against the combined cycle block. (See Example #7).

Examples in Synthesizing Block Outages and Deratings from Reported Unit-level Data

In each example, the status of each unit is discussed. Some units are not impacted at all by the outages or derates. The only reason they are listed is to show they are not impacted and have no impact on available electricity production. In actual reporting, the unaffected units would not be reported or even mentioned.

Please Note: These examples are created to simply illustrate specific cause-and-effect relationships for discussion purposes only and may or may not be real world equipment designs, installations, configurations or actual outage occurrences. The purpose of these examples is to illustrate how the outage of one unit affects other units and the entire combined cycle block.

Our example Combined Cycle Block – Big Jumbo, the combined cycle block, consists of two gas turbines, each with its own generator. Each GT has its own HRSG. The two GT/HRSG trains are connected through a manifold to a single steam turbine that also has its own generator. The total electrical combined capacity of this fictitious combination is 710 MW.

- Units – The units which make up the example combined cycle block are as follows –
 - Two 225 MW Gas Turbines numbered 301 & 302
 - One 260 MW Steam Turbine numbered 101
- Combined cycle block – The combined cycle block is a 710 MW combined cycle numbered 801

Example 1 – Three Reserve Shutdowns (RS) on different units.

Unit Event Report

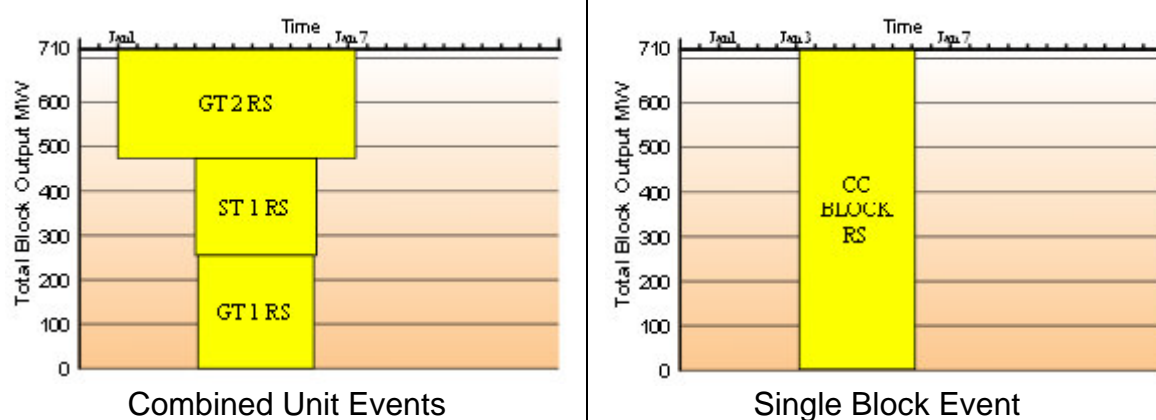
- GT #2 placed on RS from January 1 at 0000 until January 7 at 0315. GT #2 was capable of providing 225 MW during this period.
- Steam turbine unit placed on RS from January 3 at 0010 to January 6 at 0230. The steam turbine was capable of providing 260 MW during this period.
- GT #1 placed on RS from January 3 at 0015 to January 6 at 0215. GT #1 was capable of providing 225 MW during this period.

Combined Cycle Block Impact

- Big Jumbo Block placed on RS from January 3 at 0015 to January 6 at 0215. The combined cycle block has the capability to provide 710 MW during this period.

Please note that only three events were reported: one for each unit. During the RS outages, the combined cycle block was not showing any derates because the block was still capable of generating the full 710 MW but was not required to do so. There are no equipment restrictions. There are only load requirements caused the reduced loading.

Diagrams of the units and combined cycle block during this period is shown below:



Summary of Example #1:

- GT #1 on Reserve Shutdown for 74.00 hours.
- GT #2 on Reserve Shutdown for 147.25 hours.
- Steam turbine on Reserve Shutdown for 74.33 hours.
- Combined cycle block on Reserve Shutdown for 74.00 hours.

Example 2 – Single cause of derates on all units.

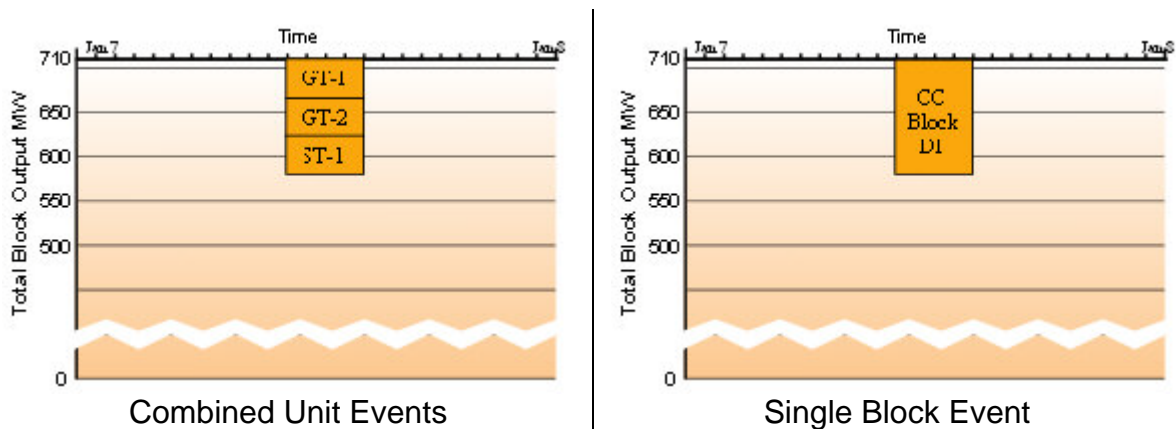
Unit Event Report

- GT #1 on D1 derate from January 7 at 1000 until January 7 at 1400. GT #1 was capable of providing 180 MW during this period. Cause code 3620 – Main Transformer.
- GT #2 on D1 derate from January 7 at 1000 to January 7 at 1400. GT #2 was capable of providing 180 MW during this period. Cause code 3620 – Main Transformer.
- Steam turbine unit on D1 derate from January 7 at 1000 to January 7 at 1400. The steam turbine was capable of providing 208 MW during this period. Cause code 3620 – Main Transformer.

Combined Cycle Block Impact

- Big Jumbo Block was on D1 derate from January 7 at 1000 to January 7 at 1400. Cause code 3620 – Main Transformer. The combined cycle block was capable to generate 568 MW.

Diagrams of the units and combined cycle block during this period is shown below:



Summary of Example #2:

- GT #1 on forced derate for 4 hours (or 0.80 Equivalent Forced Derated Hours.)
- GT #2 on forced derate for 4 hours (or 0.80 Equivalent Forced Derated Hours.)
- Steam turbine on forced derate for 4 hours (or 0.80 Equivalent Forced Derated Hours.)
- Combined cycle block on forced derate for 4 hours (or 0.80 Equivalent Forced Derated Hours.)

Example 3 – Single unit on Reserve Shutdown.

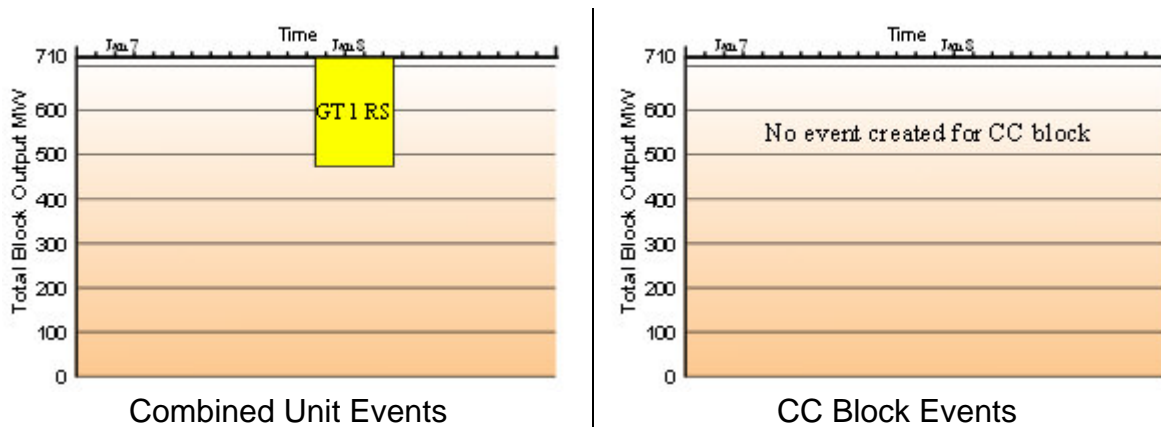
Unit Event Report

GT #1 placed on RS from January 7 at 2115 to January 8 at 0500. GT #1 was capable of providing 225 MW during this period.

Combined Cycle Block Impact

No impact on Big Jumbo Block. The combined cycle block was capable to generate 710 MW the full period.

Diagrams of the units and combined cycle block during this period is shown below:



Summary of Example #3:

- GT #1 on Reserve Shutdown 7.75 hours
- Combined cycle block – no impact

Example 4 – Single unit on outage, affecting other units and then changing event types.

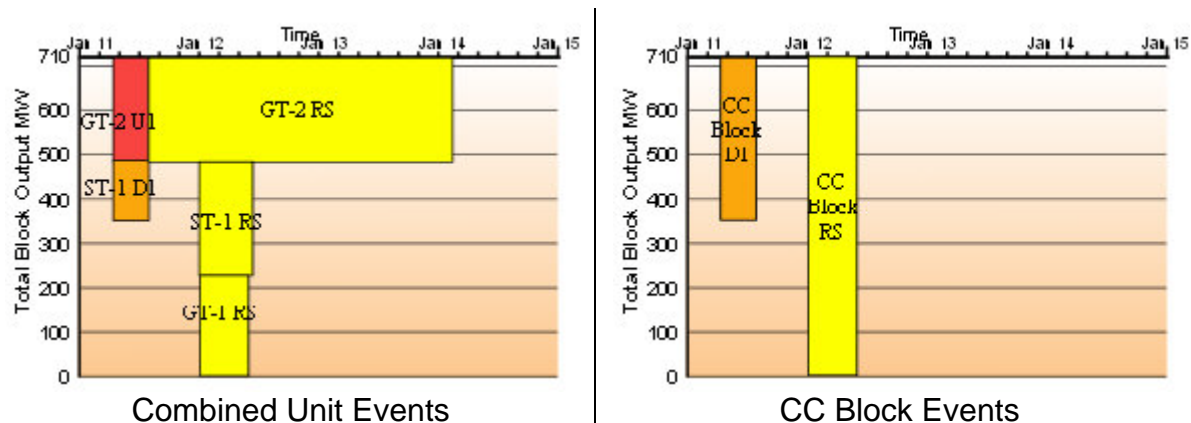
Unit Event Report

- GT #2 on Forced Outage (U1) from January 11 at 0700 to January 11 at 14:45 (cause code 5030 – supercharging fans). No supplemental firing of HRSG. GT #2 was capable of providing no MW during this period.
- As a result, steam turbine on forced derate (D1) from January 11 at 0700 to January 11 at 14:45 (cause code 5030 – supercharging fans). The steam turbine unit was capable of providing 130 MW during this period.
- GT #2 was placed on RS from January 11 at 1445 to January 14 at 0330. GT #2 was capable of providing 225 MW during this period.
- Steam turbine was placed on reserve shutdown from January 12 at 0000 to January 12 at 11:20. The steam turbine unit was capable of providing 260 MW during this period.
- GT #1 was placed on RS from January 12 at 0015 to January 12 at 0930. GT #1 was capable of providing 225 MW during this period.

Combined Cycle Block Impact

- The combined cycle block was on derate from January 11 at 0700 to January 11 at 14:45. The combined cycle block was capable to generate 355 MW the full period.
- The combined cycle block was on RS from January 12 at 0015 until January 12 at 0930. The combined cycle block was capable to generate 710 MW the full period.

Diagrams of the units and combined cycle block during this period is shown below:



Summary of Example #4:

- GT #1 on Reserve Shutdown for 9.25 hours.
- GT #2 on forced outage for 7.75 hours and on Reserve Shutdown for 60.75 hours.
- Steam turbine on forced derate for 7.75 hours (or 3.88 Equivalent Forced Derated Hours) and on Reserve Shutdown for 11.33 hours.
- Combined cycle block on forced derate for 7.75 hours (or 3.88 Equivalent Forced Derated Hours) and on Reserve Shutdown for 9.25 hours.

Example 5 – Reserve Shutdowns of unit followed by a startup failure of one unit.

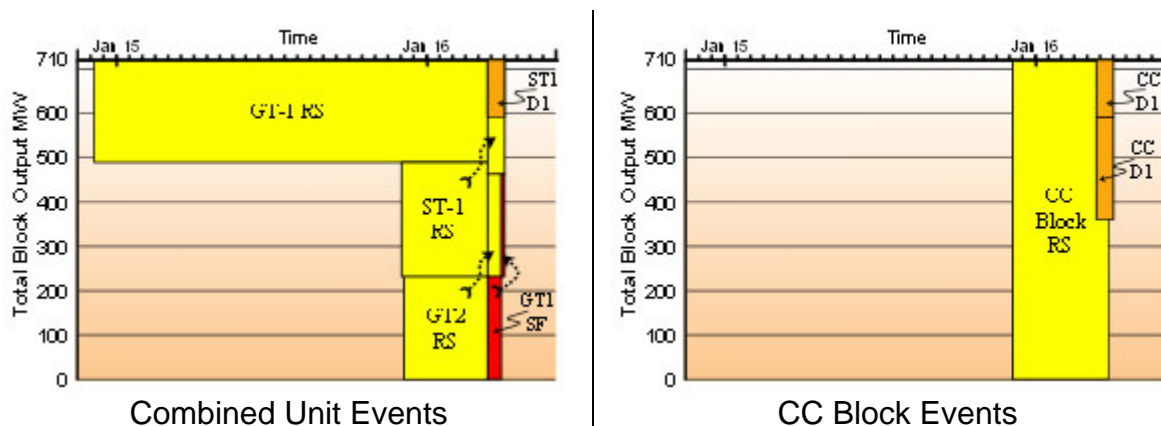
Unit Event Report

- GT #1 was placed on RS from January 14 at 2215 to January 16 at 0445. GT #1 was capable of providing 225 MW during this period.
- Steam turbine was placed on reserve shutdown from January 15 at 2300 to January 16 at 0600. The steam turbine unit was capable of providing 260 MW during this period.
- GT #2 was placed on RS from January 15 at 2310 to January 16 at 0545. GT #2 was capable of providing 225 MW during this period.
- GT #1 on Startup Failure outage (SF) from January 16 at 0445 to January 16 at 0600 (cause code 5030 – supercharging fans). No supplemental firing of HRSG. GT #1 was capable of providing no MW during this period.
- As a result of the GT#1 SF, steam turbine on forced derate (D1) from January 16 at 0445 to January 16 at 0600 (cause code 5030 – supercharging fans). The steam turbine unit was capable of providing 130 MW during this period. (Note: the steam turbine unit was on RS but it is treated as if it were in service.)

Combined Cycle Block Impact

- The combined cycle block was on RS from January 15 at 2310 until January 16 at 0545 (when GT #2 came on line). The combined cycle block was capable to generate 710 MW the full period.
- The combined cycle block was on derate from January 16 at 0445 to January 16 at 0600 caused by the SF of GT #1 and no potential steam flow to the steam turbine(cause code 5030). The combined cycle block was capable to generate 355 MW the full period.

Diagrams of the units and combined cycle block during this period is shown below:



Example 5 – Reserve Shutdowns of unit followed by a startup failure of one unit. (Continued)

Summary of Example #5:

- GT #1 on Reserve Shutdown for 30.50 hours and on Forced Outage for 1.25 hours.
- GT #2 on Reserve Shutdown for 6.58 hours.
- Steam turbine on Reserve Shutdown for 7.00 hours and on forced derate for 1.25 hours with a loss of capacity of 130MW (or 0.625 Equivalent Forced Derated Hours)
- Combined cycle block on forced derate for 1.25 hours with a loss of capacity of 355MW (or 0.63 Equivalent Forced Derated Hours) and on Reserve Shutdown for 6.58 hours.

***Note that 1 hour of the derates occur during RS

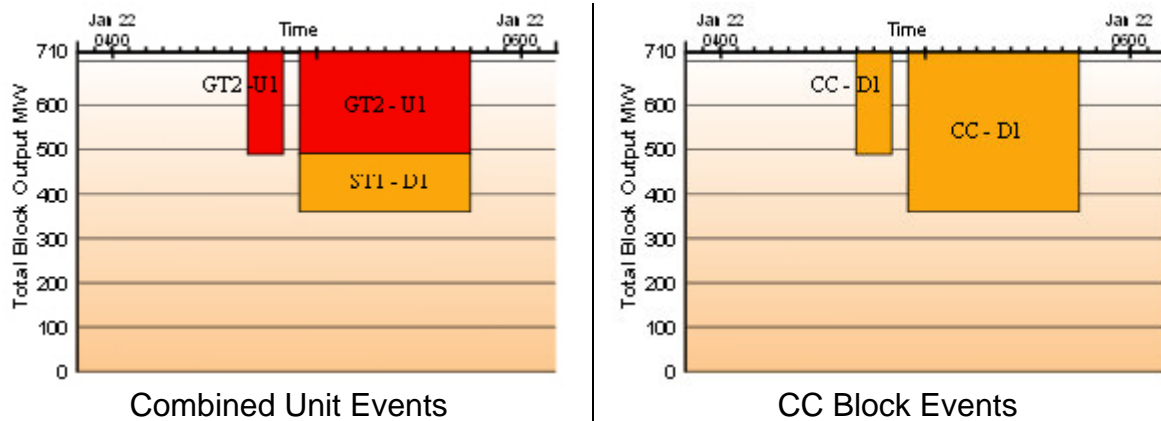
Example 6 – Unit outage to unit outage affecting other units.

Unit Event Report

- GT #2 on Forced Outage (U1) from January 22 at 0440 to January 22 at 0450 (cause code 5250 – Other Controls and instrumentation Problems).
- NOTE: Because the FO on GT#2 was so short, there was no loss of steam flow to the steam turbine. Therefore, the steam turbine unit was capable of providing 260 MW during this period.
- GT #2 on Forced Outage (U1) from January 22 at 0455 to January 22 at 0545 (cause code 5250)
- As a result of GT #2 not providing steam service, steam turbine on forced derate (D1) from January 22 at 0455 to January 22 at 0545 (cause code 5250). The steam turbine unit was capable of providing 130 MW during this period.

Combined Cycle Block Impact

- The combined cycle block was on derate (D1 – cause code 5250 – Other Controls and instrumentation Problems) from January 22 at 0440 until January 22 at 0450 (when GT #2 came on line). The combined cycle block was capable to generate 485 MW the full period.
- The combined cycle block was on derate (D1 – cause code 5250 – Other Controls and instrumentation Problems) from January 22 at 0455 to January 22 at 0545 caused by the U1 of GT #2 and no steam for steam turbine. The combined cycle block was capable to generate 355 MW the full period.



Summary of Example #6:

- GT #2 on forced outage for 1.00 hours (0.17 + 0.83 hours)
- Steam turbine on forced derate for 0.83 hours (or 0.42 Equivalent Forced Derated Hours).
- Combined cycle block on forced derate for 1.00 hour (0.17 + 0.83 hours or 0.47 [0.05 + 0.42] Equivalent Forced Derated Hours).

Example 7 – Combined cycle block annual planned outage.

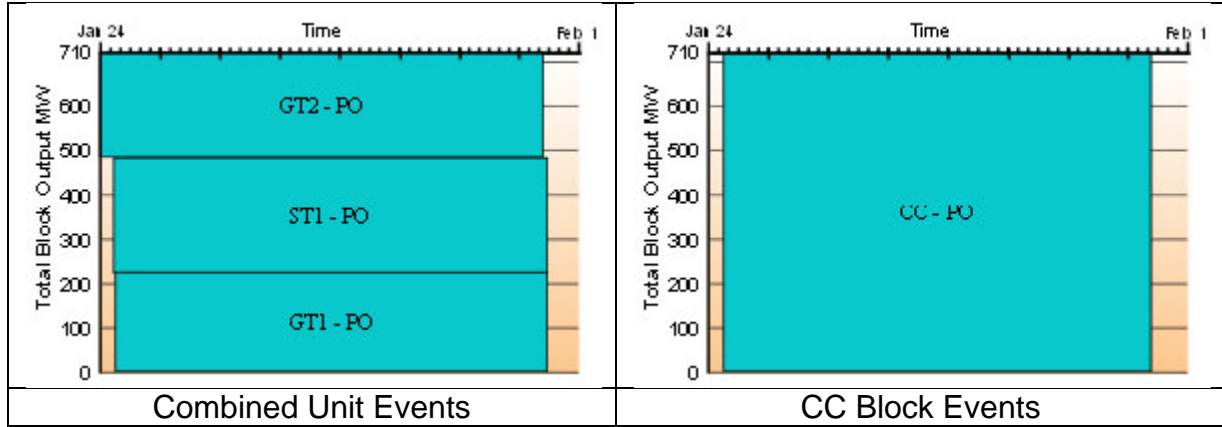
Unit Event Report

- GT #2 placed on Planned Outage from January 24 at 0000 until January 31 at 1000 (cause code 5260 – Major Gas Turbine Overhaul). GT #2 was not capable of providing power during this period.
- As a result of GT #2 not providing steam service, steam turbine on Planned Derate (PD) from January 24 at 0000 to January 24 at 0515 (cause code 5260). The steam turbine was capable of providing 130 MW during this period.
- Steam turbine unit placed on Planned Overhaul from January 24 at 0515 to January 31 at 1130 (cause code 4240 – Low Pressure steam turbine bearings). The steam turbine was not capable of providing power during this period.
- GT #1 placed on Planned Outage January 24 at 0530 to January 31 at 1015 (cause code 5272 - Boroscope inspection). GT #1 was not capable of providing power during this period.

Combined Cycle Block Impact

- The combined cycle block was placed on Planned Derate from January 24 at 0000 (when GT #2 came off line) to January 24 at 0515 (cause code 5260). The combined cycle block was capable to generate 355 MW during this period.
- The combined cycle block was placed on Planned Derate from January 24 at 0515 to January 24 at 0530, when the steam turbine was placed on Planned Outage (cause codes 5260 and 4240). The combined cycle block was capable to generate 225 MW during this period.
- The combined cycle block was placed on Planned Outage from January 24 at 0530 (when GT #1 came off line) to January 31 at 1000 (when GT #2 came on line)) (cause codes 5260, 4240, and 5272). The combined cycle block has the capability to provide no power during this period.
- The combined cycle block was placed on Planned Derate from January 31 at 1000 to January 31 at 1015, when GT #2 came on-line. The combined cycle block was capable to generate 225 MW during this period.
- The combined cycle block was placed on Planned Derate from January 31 at 1015 to January 31 at 1130, when GT #1 came on-line. The combined cycle block was capable to generate 450 MW during this period.

Now, as the combined cycle block was preparing to come off line for the PO, each unit came off in steps until the final unit (GT #1) started the combined cycle block PO. As reported for other unit types, coast down to outages are not reported to GADS. Therefore, the derates from removing GT #2 and the steam turbine are considered coast downs and not reported as penalties against the combined cycle block. However, the derates from removing and beginning outages on GT #2 and the steam turbine prior to the block outage are not considered coast downs unless they are placed on RS prior to beginning the block outage.



Summary of Example #7:

- GT #1 on Planned Outage for 172.75 hours.
- GT #2 on Planned Outage for 178.00 hours.
- Steam turbine on Planned Derate for 2.63 hours.
- Steam turbine on Planned Outage for 174.25 hours.
- Combined cycle block on Planned Outage for 172.50 hours.
- Combined cycle block on Planned Derating for 3.06 hours.

Statistics from Unit Event and Performance Reports

There will be other outages, deratings and reserve shutdown periods at a real combined cycle block. We could list more but they would just be a repeat of what is shown in the seven examples shown above. So to test the data collection methodology, we will calculate statistics for each unit and the combined cycle block using the data from the seven examples.

The time period will be January 1 at 0000 to January 31 at 2400. This is a total of 744 hours during the month of January.

Statistic	GT #1	GT #2	ST #1	CC Block
Net Maximum Capacity	225	225	260	710
Period Hrs	744	744	744	744
Forced Outage Hrs	1.25	8.75	0.00	0.00
Planned Outage Hrs	172.75	178.00	174.25	172.50
Maintenance Outage Hrs	0.00	0.00	0.00	0.00
Reserve Shutdown Hrs	121.50	214.58	92.66	89.83
Service Hrs	448.50	342.67	477.09	481.67
Equiv.Forced Derated Hrs	0.80	0.80	5.72	5.77
EFDH During RS Hrs	0.00	0.00	0.63	0.50
Equiv. Sched. Derated Hrs	0.00	0.00	2.63	3.61
Net Actual Generation	100,000	77,000	124,000	301,000.00
Attempted Starts	6.00	7.00	4.00	4.00
Actual Starts	5.00	7.00	4.00	4.00
Equiv Availability Factor	76.51%	74.79%	75.46%	75.55%
Equiv. Forced Outage Rate	0.46%	2.72%	1.20%	1.20%
Forced Outage Factor	0.17%	1.18%	0.00%	0.00%
Forced Outage Rate	0.28%	2.49%	0.00%	0.00%
Scheduled Outage Factor	23.22%	23.92%	23.42%	23.19%
Net Capacity Factor	59.74%	46.00%	64.10%	56.98%
Starting Reliability	83.33%	100.00%	100.00%	100.00%

Sample Data Summary

Event #	Unit	Event Type	Start Date	End Date	Duration	Loss MW	EDH	Example
1	GT #2	RS	01/01/0000	01/07/0315	147.25	225		1
2	ST #1	RS	01/03/0010	01/06/0230	74.33	260		
3	GT #1	RS	01/03/0015	01/06/0215	74	225		
Syn. 1	CC	RS	01/03/0015	01/06/0215	74	710		
4	GT #1	D1	01/07/1000	01/07/1400	4	45	0.8	2
5	GT #2	D1	01/07/1000	01/07/1400	4	45	0.8	
6	ST #1	D1	01/07/1000	01/07/1400	4	52	0.8	
Syn. 2	CC	D1	01/07/1000	01/07/1400	4	142	0.8	
7	GT #1	RS	01/07/2115	01/08/0500	7.75	225		3
Syn. 3	CC	NC						
8	GT #2	U1	01/11/0700	01/11/1445	7.75	225		4
9	ST #1	D1	01/11/0700	01/11/1445	7.75	130	3.88	
10	GT #2	RS	01/11/1445	01/14/0330	60.75	225		
11	ST #1	RS	01/12/0000	01/12/1120	11.33	260		
12	GT #1	RS	01/12/0015	01/12/0930	9.25	225		
Syn. 4	CC	D1	01/11/0700	01/11/1445	7.75	355	3.88	
Syn. 5	CC	RS	01/12/0015	01/12/0930	9.25	710		
13	GT #1	RS	01/14/2215	01/16/0445	30.5	225		5
14	ST #1	RS	01/15/2300	01/16/0600	7	260		
15	GT #2	RS	01/15/2310	01/16/0545	6.58	225		
16	GT #1	SF	01/16/0445	01/16/0600	1.25	225		
17	ST #1	D1	01/16/0445	01/16/0600	1.25	130	0.63	
Syn. 6	CC	RS	01/15/2310	01/16/0545	6.58	710		
Syn. 7	CC	D1	01/16/0445	01/16/0600	1.25	355	0.63	
18	GT #2	U1	01/22/0440	01/22/0450	0.17	225		6
19	GT #2	U1	01/22/0455	01/22/0545	0.83	225		
20	ST #1	D1	01/22/0455	01/22/0545	0.83	130	0.42	
Syn. 8	CC	D1	01/22/0440	01/22/0450	0.17	225	0.05	
Syn. 9	CC	D1	01/22/0455	01/22/0545	0.83	355	0.42	
21	GT #2	PO	01/24/0000	01/31/1000	178	225		7
22	ST #1	PD	01/24/0000	01/24/0515	5.25	130	2.63	
23	ST #1	PO	01/24/0515	01/31/1130	174.25	260		
24	GT #1	PO	01/24/0530	01/31/1015	172.75	225		
25	CC	PD	01/24/0000	01/24/0515	5.25	355	2.63	
26	CC	PD	01/24/0515	01/24/0530	0.25	485	0.17	
27	CC	PO	01/24/0530	01/31/1000	172.5	710		
28	CC	PD	01/31/1000	01/31/1015	0.25	485	0.17	
29	CC	PD	01/31/1000	01/31/1130	1.75	260	0.64	

